It would be a natural consequence of such explosive actions as have here been suggested, that each of the greater planets would have a dependent family of meteor systems, or comets, revolving in orbits approaching very near to the orbits of their respective parent planets. We might not, or rather we certainly should not, be able to detect from the Earth one in many hundreds of these dependent comets ; and if any were detected, the just inference would be that an enormous number of such comets existed. I need hardly remind those who will read these lines that many comets depending in just such a manner on the planet *Jupiter* have been already detected; that the case is the same with *Neptune;* that there is one comet at least, which on this view of the matter must be regarded as Saturnian ; and that of course the system of bodies I am considering would be regarded as a dependant of the planet *Uranus.*

A rather singular result would follow (as Professor Herschel has reminded me) from the theory here considered. Comets expelled from *Jupiter*, partaking of his rapid motion of advance would be found to travel for the most part in the same direction as the planet. Comets expelled from the much more slowly moving *Neptune* would be as likely to travel in either direction. This agrees with observation. All the comets whose aphelia lie near the orbit of *Jupiter* advance ; a considerable number of those whose aphelia lie near the orbit of *Neptune* regrede.

Lastly, it is obvious that, according to this theory, one or other of the nodes of each of these comets should lie very close to the orbit of the planet from which the comet had been expelled. Now the nodes of all the Jovian and Neptunian comets, as well as of the Saturnian comet and Tempel's (the Uranian) comet, lie near to the orbits of their ruling planets. In the case of Encke's comet, whose aphelion is now far away from *Jupiter's* orbit, and gradually drawing inwards away from it, the further node is necessarily very far from the orbit of *Jupiter.* But this node lies as close to that orbit as is possible under the circumstances, being so near to the aphelion that one may say the line of nodes coincides with the line of apses.

On Two probable Early Appearances of the Comet of the November Meteors (1866, I. *Tempel.*)   By Mr. Hind.

Some ten years since I calculated three or four orbits for the comet observed by the Chinese during the last week in October, 1366, somewhat varying in each case the interpretation of the path described in their annals, as it is presented by M. Edouard Biot in the appendix to the *Connaissance des Temps* for 1846. The orbits bore a sufficient general resemblance to indicate the possibility of arriving at a correct idea of the elements, though on one point in the interpretation there remained a doubt.

When the similarity of the orbit of the November meteors with that of the first Comet of 1866, discovered by M. Tempel, was pointed out by Dr. Peters, I remarked that it also presented considerable resemblance to the orbits I had deduced for the Comet of 1366, and the probability that this was an early appearance of Tempel's comet immediately occurred to me. Under these circumstances I applied to our Assistant-Secretary, Mr. Williams (whose extensive acquaintance with the Chinese language and Chinese astronomy is well known to the Fellows of this Society) requesting his aid in clearing up the doubt I have alluded to ; and I am indebted to Mr. Williams for enabling me to state, with what I conceive a high degree of probability, that the Comet of 1366 (which does not appear to have been remarked in Europe) was the one now known to be associated with the November meteor stream.

Now, in October 1366, we have recorded a most imposing shower of meteors, one of the November series, discovered by Professor Newton. It was observed on the banks of the Tagus, and also in Bohemia. Humboldt gives us a description from a Portuguese Chronicle, which is thus translated in one of our editions of *Cosmos:* " In the year 1366, and xxii. days of the month of October being past, three months before the death of the King Dom Pedro, there was in the heaven a movement of stars, such as men never before saw or heard of. At midnight, and for some time after, all the stars moved from the east to the west ; and after being collected together, they began to move, some in one direction and others in another. And afterwards they fell from the sky in such numbers, and so thickly together, that as they descended low in the air, they seemed large and fiery, and the sky and the air seemed to be in flames, and even the Earth appeared as if ready to take fire. That portion of the sky where there were no stars, seemed to be divided into many parts, and this lasted for a long time." Then follows a reference to the " great fear and dismay " which this phenomenon occasioned.

We have here, I do not doubt, a description of the appearances in the heavens occasioned by the proximity of a comet, for it is certain that the comet observed in China was close upon the Earth at the time of this memorable display, and as I have stated it appears highly probable that this was the comet in the track of which these swarms of meteoric bodies revolve.

It is not unlikely that in the rich store of cometary records which Mr. Williams has lately enabled us to consult, several other appearances of the meteor-comet of November may be recognised. At present I have only succeeded in finding one, in addition to that of 1366, and in this case it is the European Chronicles which put us in possession of the track of the comet. In 868 at the end of January a comet was observed under the tail of *Ursa Minor*, which moved in seventeen days almost to the constellation *Triangulum*. In China it was seen in the 1st Moon (February) with the same right ascension as stars in *Aries*

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and *Musca.* I find, by calculation, that when Tempel's Comet arrives at perihelion at the end of March or early in April, it must follow this path in the heavens, being first situated at the end of January in the constellation *Camelopardus*, when, for want of conspicuous stars of reference, it might be said to be below the tail of *Ursa Minor*, afterwards moving to *Triangulum* and *Aries*.

Between 1866 and 1366 we should have fifteen periods of 33·28 years, and between 1366 and 868, also fifteen periods of 33·24 years.

Note on the First Comet of 1818 (*Pons, February* 23).
By Mr. Hind.

In the last number of the *Monthly Notices*, Professor Herschel, following Dr. Weiss, alludes to a possible connexion of the first Comet of 1818, at some previous time, with Biela's Comet. The hypothesis is founded upon an apparent similarity of an orbit calculated by Mr. Pogson for the Comet of 1818 to that of Biela, but it is one that will not bear examination.

The particulars of Pons' observations, or rather estimation of the positions of the Comet of 1818, will be found in *Zeitschrift für Astronomie*, vol. v. p. 148. Four places are given with two obvious errors. Correcting these, I have endeavoured to find the orbit which would best accord with the rough data, and have fixed upon the following elements:—

Perihelion Passage, 1818, February 3·218 G.M.T.

Longitude of Perihelion	76° 18′
Ascending Node	256 1
Inclination	34 11
Distance in Perihelion	0·6959

Motion direct.

These elements cannot be said to favour the supposed connexion of the Comet with that of Biela.

But the direct calculation of the orbit from such imperfect data for comparison with that of the periodical comet, is not in this case the most legitimate or satisfactory method of putting the above supposition to the test. We know pretty nearly what were the elements of Biela's Comet in 1772 when it was first observed, and we have accurate determinations of the orbit in 1806 and 1826. We can therefore ascertain whether it is possible to represent the observed position of Pons' comet at discovery by the elements of Biela's. I first adopt the elements of 1826, and find that with a true anomaly $= -37° 55′$, the observed and computed longitudes would agree, but the difference of latitudes is no less than 26°. Again, if the orbit for 1772 is employed, the inclina-